ANALYSIS CALCULATIONS versus LABORATORY TEST  
for BLAST RESISTANT DOORS

Protective Door Industries (PDI) has been designing and fabricating special purpose doors for over 60 years and is the established reputable manufacturer of blast resistant doors in the United States and internationally.

Through the years, PDI has laboratory tested blast resistant doors both statically and dynamically; however, this is not the preferred method for a thorough analysis. The laboratory testing is limited in its’ results; it only provides pass / fail results. The actual load applied to the door is known, but the major problem with the pass / fail criteria is that the resultant loads applied to the frame, frame anchorage and hardware are unknown due to the elasticity (stiffness) of the door panel. Singles, pairs, transom, door sizes, frame profile, frame anchorage, wall type, blast pressure and time duration are all variables that affect the overall design required for each individual door system. It is impossible to do testing that meets all the variables listed above along with each project’s requirements.

Due to the many variables, PDI produces analysis calculations which cover all the required design variables and resultant loads. These analysis calculations are performed either statically or dynamically. Static analysis is completed using simple beam diagrams while dynamic analysis is based upon plate design methodology under the UFC 3-340-02 ‘Structures to Resist the Effects of Accidental Explosions’ manual (previously Army Technical Manual TM5-1300).

Both methods of analysis have been used for years and considered standard in the industry.

Customary to special purpose blast doors, PDI will submit for approval a complete engineering package with drawings containing frame arrangement, anchorage, door panel, hinges and latching hardware along with a thorough set of calculations. PDI can submit in-house analysis calculations or as an option, offer the services of a PE Professional Engineer to analyze the blast criteria and stamp the cover sheet of the calculations. Upon request, PDI can employ their services to perform a Finite Element Analysis (FEA). PDI’s engineering consultants are registered in the states of Illinois, Pennsylvania and others.